

REMARKS/ARGUMENTS

Claims 19 – 39 are pending in the application. Claims 1 – 18 were canceled by a previous amendment. Claims 20, 25, 26, 30, and 31 are canceled by the present Amendment. New claims 40 – 43 are added by the present Amendment. No new matter is added.

Claims 19 – 39 are rejected under 35 U.S.C. §112, 2nd paragraph as indefinite. The present amendments overcome the specific §112 rejections as follows:

- Claim 19 is amended to further define the structure of the fabric and structural connections between the elements;
- Claim 19 is further amended with the transitional phrase “comprising” instead of “wherein,” as suggested in the Office Action;
- Claim 21 is amended to delete the term “so-called”;
- Claim 26 is deleted, mooting the rejection thereto;
- Claims 30 and 31 are canceled, mooting the rejections thereto;
- Claim 32 is amended that cut-and-sewn clothes and garments comprise the knitted fabric of claim 19;
- Claim 33 is amended to provide a proper antecedent basis for “sleeves,” and to depend from claim 32;
- Claims 34 – 36 are amended to set forth steps in the method claims;
- Claim 37 is amended to further define the process for production of the knitted fabric (which also applies to dependent claims 38 and 39); and
- Claim 38 is amended to delete the term “so-called.”

Accordingly, in view of the above amendments, Applicant respectfully requests reconsideration and withdrawal of the §112, 2nd paragraph rejections to claims 19 – 39.

Claims 19 – 25 and 27 – 39 are rejected under 35 U.S.C. §103(a) over Paradiso, et al. “Knitted Bioclothes for Cardiopulmonary Monitoring,” (hereinafter, “Paradiso, et al.”) in

view of WO 01/02052 to DeMeyere, et al., of Bekaert S.A. (hereinafter referred to as “Bekaert,” to be consistent with the Office Action). Claims 19 and 34 – 37 are independent claims.

In addition, dependent claim 26 is rejected under 35 U.S.C. §103(a) over Paradiso, in view of Bekaert, and further in view of Wijesiriwardana, et al., “Resistive Fibre-Meshed Transducers,” (hereinafter, “Wijesiriwardana”).

Claims 20, 25, 26, 30, and 31 are canceled by the present Amendment, mooting the §103(a) rejections thereto. However, since the features in canceled claims 20, 25, and 26 are now incorporated (with minor changes) into independent claims 19 and 34 – 37, all of the cited art references are discussed below with respect to the amended claims.

Independent claims 19 and 34 – 37 each recite, in pertinent part, a knitted fabric having piezoresistive sensors “...wherein said piezoresistive sensors are made with an elastic fabric coated with carbon-loaded rubber or latex” [emphasis added].

As described below, none of the three cited art references, alone or in combination, disclose or suggest the combination of features in independent claims 19 and 34 – 37. In particular, none of the cited art documents discloses that a coated fabric is used for the implementation of piezoresistive sensors (i.e., “piezoresistive sensors are made with a elastic fabric coated with carbon-loaded rubber or latex”), as in claims 19 and 34 – 37.

With regard to Bekaert, Applicant would point out that Bekaert provides no hint or suggestion towards a knitted fabric with piezoresistive sensors, as Bekaert discloses use of electrodes comprising metal fibers only. Such electrodes do not have piezoresistive properties, and therefore Applicant would submit that Bekaert actually directs a person having ordinary skill in the art away from the solution in independent claims 19 and 34 – 37.

Furthermore, the conductive zones of Bekaert are not elastic in terms that a high elasticity is allowed when using the structure as a garment, since the steel fibers hinder elastic compensation, unlike the structures recited in claims 19 and 34 – 37.

As acknowledged in the Office Action, the publication by Paradiso, et al., “fails to disclose the details of the multiple layer structure, particular materials, and processes for making.”

Therefore, for at least the above reasons, it would not have been obvious at the time of this application for a person having ordinary skill in the art to have used the teaching in Bekaert to modify the cited publication by Paradiso, et al., to develop the structures recited in independent claims 19 and 34 – 37.

For at least the same reasons as provided above for the independent claims, dependent claims 21 – 24, 27 – 29, 32, 33, 38, and 39 are also not obvious over the cited art.

Accordingly, Applicant submits that claims 19, 21 – 24, 27 – 29, and 32 – 39 are not obvious over the cited publication by Paradiso, et al., in view of Bekaert, and respectfully request reconsideration and withdrawal of the §103(a) rejections thereto.

Wijesiriwardana addresses the technical problem to provide a knitted fabric having a sensor function, where the measured results are more accurate and the hysteresis effect is reduced.

However, Wijesiriwardana is directed to resistive fiber-meshed transducers having conductive elastomeric fibers. Starting from the publication by Paradiso, et al., a person having ordinary skill in the art would not have developed the features in claims 19 and 34 – 37 based on the technical teaching in Wijesiriwardana, as it is not mentioned in Wijesiriwardana that piezoresistive sensors are made with an elastic fabric coated with carbon-loaded rubber or latex.

Such a structure is particularly advantageous as the use of such material provides a sensitive sensor. Furthermore, the hysteresis effect of such a fabric may be reduced significantly. The reduction is achieved by the different sensor types as in claim 19, namely that the piezoresistive yarn and the piezoresistive sensors made with an elastic fabric coated with carbon-loaded rubber. Said layer of carbon-loaded rubber or latex on the fabric surface provides a homogeneous structure, where the response to the mechanical stimulus is related to the intrinsic elasticity of the rubber or latex. Therefore the hysteresis effects can be reduced due to the elasticity of the rubber.

Additionally, related to the signal amplitude to a given mechanical stimulus, the use of the rubber or latex loaded with carbon particles near the percolation threshold is an additional feature providing a higher sensitivity.

In particular this effect becomes relevant, if the piezoelectric property is due to the strain applied to the interconnection of the single loop of the knitted fabric, as in this case the friction among different loops in the junction point is greater.

Therefore, Applicant submits that the cited publications by Paradiso, et al., Bekaert, and Wijesiriwardana, taken alone or in combination, fail to disclose or suggest independent claims 19 and 34 – 37.

Likewise, for at least the same reasons as provided above for the independent claims, dependent claims 21 – 24, 27 – 29, 32, 33, 38, and 39 are also not obvious over the cited art.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the §103(a) rejections to claims 19, 21 – 24, 27 – 29, and 32 – 39.

Claims 35 and 36 are objected to under 37 C.F.R. §1.75 as being a substantial duplicate of claim 34 [Note: the heading "Double Patenting" above the objection appears to be a typographical error in the Office Action].

Claims 35 and 36 are both amended by the present Amendment. At least one step in claim 35 and in claim 36 (i.e., "detecting...") is different than claim 34, such that claims 35 and 36 are not duplicates or substantial duplicates of claim 34.

Therefore, Applicant respectfully requests reconsideration and withdrawal of the objections to claims 35 and 36.

As to new claims 40 – 43, Applicant submits that, for at least the same reasons as provided above, claims 40 – 43 are not anticipated or obvious over the cited art, taken alone or in combination.

Thus, in view of the amendments and arguments above, Applicant submits that the pending claims in the application are now in condition for allowance. Accordingly, Applicant respectfully requests issuance of a Notice of Allowability for claims 19, 21 – 24, 27 – 29, and 32 – 43.

Respectfully submitted,

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Date



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